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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
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**LEVY NUCLEAR PLANT, UNITS 1 AND 2
DOCKET NOS. 52-029 AND 52-030
PARTIAL RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 121
RELATED TO SRP SECTION 6.2.5, COMBUSTIBLE GAS CONTROL IN CONTAINMENT**

Reference: Letter from Donald Habib (NRC) to Christopher M. Fallon (DEF), dated September 24, 2014, "Request for Additional Information Letter No. 121 Related to Standard Review Plan Sections 6.2.5 and 6.4 for the Levy Nuclear Plant, Units 1 and 2, Combined License Application"

Ladies and Gentlemen:

Duke Energy Florida, Inc. (DEF) hereby submits a partial response to the Nuclear Regulatory Commission's (NRC) request for additional information (RAI) provided in the referenced letter. A response to the NRC request is addressed in Enclosure 1 to this letter.

The response to the RAI involves a change to the **AP1000** Design Control Document (DCD) Revision 19 information. The Levy Nuclear Plant (LNP) Combined License Application (COLA) incorporates the **AP1000** DCD by reference. The change involves a departure from DCD Tier 1 Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) as well as an associated DCD Tier 2 departure, but does not involve a change to the design. A request for exemption from Tier 1 material is provided in Enclosure 2. The request for exemption includes a summary and detailed description of the change to the acceptance criteria for the combustible gas control system inside containment, the associated changes to the licensing basis, the technical evaluation of the change, the regulatory evaluation (including the exemption, justification and the Significant Hazards Consideration determination) of the change, and the risk assessment.

DEF review has determined that the ITAAC described in Tier 1 Table 2.3.9-3 cannot be met by the certified design. Although this issue may not exceed the criteria established in DC/COL-ISG-011 "Finalizing Licensing-basis Information," DEF has elected to revise the ITAAC described in Tier 1 Table 2.3.9-3 rather than consider the deferral of this change to post-COL.

Enclosure 3 contains revisions to the Final Safety Analysis Report (FSAR) and COLA Parts 7 and 10 in order to implement the change. These revisions will be incorporated into the next revision of the LNP COLA.

If you have any further questions, or need additional information, please contact Bob Kitchen at (704) 382-4046, or me at (704) 382-9248.

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I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 30, 2015.

Sincerely,

A handwritten signature in black ink that reads "Christopher M. Fallon". The signature is written in a cursive, flowing style.

Christopher M. Fallon
Vice President
Nuclear Development

Enclosures:

1. Partial Response to NRC RAI Letter No. 121
2. Request for Exemption Regarding Combustible Gas Control in Containment
3. Levy Nuclear Plant Units 1 and 2 COLA Revisions

cc: U.S. NRC Region II, Regional Administrator (w/o enclosures)
Mr. Donald Habib, U.S. NRC Project Manager (w/ enclosures)

**Levy Nuclear Plant Units 1 and 2 (LNP)
Partial Response to NRC Request for Additional Information Letter No. 121 Related to
Standard Review Plan Section 6.2.5, Combustible Gas Control in Containment, dated
September 24, 2014**

NRC RAI #

06.02.05-1

Duke Energy RAI #

L-1115

Duke Energy Response

Partial response enclosed – see following
pages

NRC Letter No.: LNP-RAI-LTR-121

NRC Letter Date: September 24, 2014

NRC Review of Final Safety Analysis Report

NRC RAI NUMBER: 06.02.05-1

Text of NRC RAI:

AP1000 Hydrogen Vent Path - Chemical and Volume Control System (CVS) and Passive Core Cooling System (PXS) compartments allow for venting of hydrogen into the Core Makeup Tank (CMT) rooms above. Vent layout is designed so hydrogen burns away from the containment shell. This is to ensure containment integrity during postulated beyond-design-basis hydrogen releases from small compartments to keep sustained burning hydrogen plumes away from the containment shell.

Acceptance Criteria in AP1000 DCD, Tier 1 Table 2.3.9-3 Inspection, Tests, Analyses and Acceptance Criteria, requires 98 percent of the primary openings through the ceilings of the passive core cooling system valve/accumulator rooms and the containment shell is to be at least 19 feet and all other openings must be 3 feet away. At a public meeting held on July 23, 2014 (ML14192A803) with Westinghouse, the staff received information that challenges the ability of the plant to meet the ITAAC. Please provide an explanation for how you intend to satisfy the existing ITAAC.

Design Criteria in AP1000 DCD, Tier 2 Section 6.2.4.5.1 Preoperational Inspection and Testing for Hydrogen Ignition Subsystem, references the above Acceptance Criteria for location of the openings.

DEF RAI ID #: L-1115

DEF Partial Response to NRC RAI:

The intent of the ITAAC in question is to ensure that in the postulated beyond-design-basis accident (severe accident) scenarios discussed in DCD Subsections 19.34 and 19.41, hydrogen generated as a result of the accident which migrates to the passive core cooling system (PXS) compartments (Rooms 11206 and 11207) is vented through large openings in the ceilings of these rooms such that, in the event of ignition of the hydrogen plume, a failure of the containment shell will not result.

The original design analysis to determine diffusion flames and thermal loading on the containment boundaries at the Core Makeup Tank (CMT) level (as shown in DCD Figure 1.2-7) during severe accidents was based on the original **AP600** and **AP1000** plant configurations. This analysis provided the basis for stating that the Containment Hydrogen Control System (VLS) does not result in a failure of the containment shell in the event of ignition of a postulated hydrogen plume. The ITAAC acceptance criteria currently contained in the **AP1000** DCD Revision 19, Tier 1 Table 2.3.9-3, Item 3, for control of containment hydrogen concentration for beyond design basis accidents, was based on the original plant configurations, but was not updated as the design of the subject PXS compartments evolved over time. The ITAAC as

written is not consistent with the actual plant configuration of large ceiling openings contained in DCD Revision 19 and the proximity of these openings to the containment shell.

A proposed clarification of the ITAAC acceptance criteria for Table 2.3.9-3, Item 3, reads as follows:

"iii) The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell. An analysis exists and concludes that ignition of postulated hydrogen releases through these openings will not result in a failure of the containment shell."

A corresponding change to the second paragraph of the **AP1000** DCD, Tier 2, Subsection 6.2.4.5.1, Preoperational Inspection and Testing for the Hydrogen Ignition Subsystem, is proposed to read as follows:

"Pre-operational inspection is performed to verify the location of openings through the ceilings of the passive core cooling system valve/accumulator rooms with respect to the containment pressure boundary. An analysis will be used to demonstrate that postulated hydrogen releases through these openings do not result in a failure of the containment shell."

A departure from the DCD is required to address the changes described above, and the change to Tier 1 Table 2.3.9-3 requires an exemption. The exemption request and the departure evaluation are part of this response and are addressed in Enclosures 2 and 3.

References:

None

Associated LNP COL Application Revisions:

See Enclosure 3.

**Duke Energy
Enclosure 2
Levy Nuclear Plant Units 1 and 2
Request for Exemption
Regarding
Combustible Gas Control in Containment
(8 pages including cover page)**

1.0 Summary Description

Passive Core Cooling System (PXS) compartments allow for venting of hydrogen into the Core Makeup Tank (CMT) rooms above. Vent layout is designed such that burning of postulated beyond-design-basis accident hydrogen releases from small compartments will not result in a failure of the containment shell.

Acceptance Criteria in **AP1000** DCD, Revision 19, Tier 1 Table 2.3.9-3 Inspections, Tests, Analyses and Acceptance Criteria (ITAAC), requires 98% of the primary openings through the ceilings of the PXS valve/accumulator rooms must be at least 19 feet away from the containment shell and all other openings must be at least 3 feet away.

The ITAAC acceptance criteria for the primary ventilation paths through the ceilings of the PXS valve/accumulator rooms (Rooms 11206 and 11207) and the proximity of these paths to the containment shell are not consistent with the current design of the plant.

2.0 Description of Licensing Basis Impacts

Tier 1 Changes

The change to Tier 1 does not involve physical plant changes to the Tier 1 information contained in the **AP1000** DCD, but rather is a change to the acceptance criteria to be applied to a specific ITAAC design commitment and associated inspection, test or analysis based on the existing design configuration. The revised Tier 1 Table 2.3.9-3, Item 3, Acceptance Criteria iii, states:

The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell. An analysis exists and concludes that ignition of postulated hydrogen releases through these openings will not result in a failure of the containment shell.

Tier 2 Changes

The change to Tier 2 does not involve physical plant changes to the Tier 2 information contained in the **AP1000** DCD, but reflects a change to the design criteria for the PXS valve/accumulator room vents as set forth in DCD Subsection 6.2.4.5.1, Preoperational Inspection and Testing for the Hydrogen Ignition Subsystem.

3.0 Technical Evaluation

Acceptance Criteria in Revision 19 of the **AP1000** DCD, Tier 1 Table 2.3.9-3 Inspections, Tests, Analyses and Acceptance Criteria, requires 98% of the primary openings through the ceilings of the passive core cooling system valve/accumulator rooms and the containment shell are at least 19 feet and all other openings must be 3 feet away.

The intent of the ITAAC in question is to ensure that in the postulated beyond-design-basis accident (severe accident) scenarios discussed in DCD Subsections 19.34 and 19.41, hydrogen generated as a result of the accident which migrates to the passive core cooling system (PXS) compartments (Rooms 11206 and 11207) is vented through large openings in the ceilings of these rooms such that, in the event of ignition of the hydrogen plume, a failure of the containment shell will not result.

The ITAAC currently contained in the **AP1000** DCD, Tier 1 Table 2.3.9-3, Item 3, for control of containment hydrogen concentration for beyond design basis accidents, was based on the original **AP600** and **AP1000** design. The design of these areas has evolved over time, and the ITAAC acceptance criteria for the primary vent paths through the ceilings of the PXS valve/accumulator rooms (Rooms 11206 and 11207) and the proximity of these paths to the containment shell are not consistent with the current design of the plant.

Thus, a change to Tier 1 Table 2.3.9-3, Item 3, Acceptance Criteria iii, is required. An analysis will exist and conclude that the configuration of the vent paths from the PXS valve/accumulator rooms will not result in a failure of the containment shell in the event of ignition of a postulated hydrogen plume.

4.0 Regulatory Evaluation

4.1 Exemption Justification

- 4.1.1 Pursuant to 10 CFR §52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for a plant-specific Tier 1 non-material departure from the **AP1000** DCD for Tier 1 information. This non-material departure is contained in Tier 1 Table 2.3.9-3. This exemption request is in accordance with the provisions of 10 CFR §50.12, 10 CFR §52.7, and 10 CFR Part 52, Appendix D, as demonstrated below.

Applicable Regulation(s): 10 CFR Part 52, Appendix D, Section III.B
Specific wording from which exemption is requested:

"III. Scope and Contents

- B. An applicant or licensee referencing this appendix, in accordance with Section IV of this appendix, shall incorporate by reference and comply with the requirements of this appendix, including Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3 of the DCD), and the generic TS except as otherwise provided in this appendix. Conceptual design information in the generic DCD and the evaluation of severe accident mitigation design alternatives in appendix 1B of the generic DCD are not part of this appendix."

- 4.1.2 DEF evaluated this exemption request in accordance with 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR §50.12, 10 CFR §52.7 and 10 CFR §52.63, which state that the NRC may grant exemptions from the requirements of the regulations provided the following six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, Appendix D, VIII.A.4]. The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. This exemption is authorized by law

The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR §50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the **AP1000** certified (Tier 1) design information. The plant-specific Tier 1 DCD will continue to reflect the approved licensing basis for the applicant, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. Because the change to the ITAAC acceptance criteria in Tier 1 Table 2.3.9-3 maintains the design margins of the Containment Hydrogen Control System, the changed acceptance criteria will ensure the protection of the health and safety of the public. Therefore, no adverse safety impact which would present any additional risk to the health and safety of the public is present. The affected Design Description in the plant-specific Tier 1 DCD will continue to provide the detail necessary to support the performance of the associated ITAAC.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific Tier 1 DCD by departing from the **AP1000** certified (Tier 1) information relating to the control of combustible gas inside containment. The exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR §50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, one of these special circumstances

must be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR §50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption from Tier 1 Table 2.3.9-3 is 10 CFR 52, Appendix D, Section III.B, which requires that an applicant referencing the **AP1000** Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The Levy Units 1 and 2 COLA references the **AP1000** Design Certification Rule and incorporates by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the **AP1000** design certification, and to require compliance with the design certification information in Appendix D to maintain the level of safety in the design.

The proposed change to the ITAAC acceptance criteria for combustible gas control does not reduce the design margins of the Containment Hydrogen Control System. This change does not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information in Tier 1 Table 2.3.9-3 will enable the applicant to safely construct and operate the **AP1000** plant consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

Based on the nature of the change to the plant-specific Tier 1 information and the understanding that this change does not impact the design function of the Containment Hydrogen Control System, other **AP1000** applicants and licensees will likely request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design function of the Containment Hydrogen Control System associated with this request will continue to be maintained. This exemption request and the associated marked-up Tier 1 Table 2.3.9-3 demonstrate that the Containment Hydrogen Control System function continues to be maintained following implementation of the change from the generic **AP1000** DCD, thereby minimizing the safety impact resulting from any reduction in standardization.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in

standardization caused by the exemption. In fact, as described in Condition 6 below, the exemption will result in no reduction in the level of safety.

6. The design change will not result in a significant decrease in the level of safety.

The exemption revises the plant-specific DCD Tier 1 information by revising the acceptance criteria for an ITAAC in Table 2.3.9-3. There is no physical change to the plant associated with the change to the ITAAC acceptance criteria. Because the Containment Hydrogen Control System function is met, there is no reduction in the level of safety. Therefore, the change will not result in a significant decrease in the level of safety.

As demonstrated above, this exemption request satisfies NRC requirements for an exemption to the design certification rule for the **AP1000** plant.

4.2 Significant Hazards Consideration

4.2.1 Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

No accident previously evaluated in the plant-specific DCD is attributed to the failure of the Containment Hydrogen Control System to control the burning of hydrogen gas vented through the ceilings of the PXS compartments. The proposed change is only to the acceptance criteria of an ITAAC to reflect the current plant design and does not result in any physical changes to the plant nor any components added to the plant. As the proposed change does not involve any components that could initiate an event by means of component or system failure, the change does not increase the probability of a previously evaluated accident.

The change does not alter design features available during normal operation or anticipated operational occurrences. Nonsafety-related features used for reactor coolant activity monitoring, or reactor coolant chemistry control remain unaffected. The change does not adversely impact accident source term parameters or affect any release paths used in the safety analyses, which could increase radiological dose consequences. Thus the radiological releases associated with the Chapter 15 accident analyses are not affected.

The change to the ITAAC would not result in an increase to the consequences of an accident previously evaluated in the plant-specific DCD. The change only modifies the acceptance criteria of the ITAAC to be consistent with the design and does not add or remove components that would have an impact on the consequences of an accident. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

4.2.2 Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

An analysis of diffusion flame zones of influence and impacts based on the as-built ventilation path configuration described in the revised ITAAC acceptance criteria will be used to demonstrate that a failure of the containment shell does

not result. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

4.2.3 Does the proposed change involve a significant reduction in a margin of safety?

The proposed change does not involve a significant reduction in the margin of safety. The proposed change does not reduce the redundancy or diversity of any safety-related functions.

The DCD Chapters 6 and 15 analyses results are not affected, thus margins to the regulatory acceptance criteria are unchanged. No design basis safety analysis or acceptance criterion is challenged or exceeded by the proposed change. Therefore, the proposed change does not involve a significant reduction in a margin of safety.

4.3 Applicable Regulatory Requirements/Criteria

10 CFR 52, Appendix D, Section VIII.B.5.a requires that an applicant or licensee who references this appendix may depart from Tier 2 information, without prior NRC approval, unless the proposed departure involves a change to or departure from Tier 1 information, Tier 2* information, or the Technical Specifications, or requires a license amendment under paragraphs B.5.b or B.5.c of that section. When evaluating the proposed departure, an applicant or licensee shall consider all matters described in the plant-specific DCD. This exemption request involves a departure from Tier 1 Table 2.3.9-3, with a Tier 2 involved departure.

4.4 Precedent

No precedent is cited.

4.5 Conclusions

Based on the considerations discussed above:

- (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and
- (2) such activities will be conducted in compliance with the Commission's regulations, and
- (3) the issuance of the exemption will not be inimical to the common defense and security or to the health and safety of the public.

The above evaluations demonstrate the requested changes can be accommodated without an increase in the probability or consequences of an accident previously evaluated, without creating the possibility of a new or different kind of accident from any accident previously evaluated, and without a significant reduction in a margin of safety. Having arrived at negative declarations with regard to the criteria of 10 CFR 50.92, this assessment determines the requested change does not involve a Significant Hazards Consideration.

5.0 Risk Assessment

A risk assessment was determined to be not applicable to address the acceptability of this request.

6.0 References

- 1) Westinghouse Electric Company, **AP1000** Design Control Document, Revision 19, June 2011

Duke Energy
Enclosure 3
Levy Nuclear Plant Units 1 and 2
COLA Revisions
(12 pages including cover page)

The following are the revisions to the LNP Units 1 and 2 COLA based on the changes presented in the previous enclosures.

COLA Part 2, FSAR

COLA Part 2, FSAR Chapter 1, Table 1.8-201, Summary of FSAR Departures from the DCD, will be revised to add the following departure:

Departure Number	Departure Description Summary	FSAR Section or Subsection
LNP DEP 6.2-1	The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration. An analysis will be used to demonstrate a postulated hydrogen diffusion flame would not result in a failure of the containment shell. The following are the departures from the DCD: Tier 1 Table 2.3.9-3, Tier 2 Subsection 6.2.4.5.1.	6.2.4.5.1

COLA Part 2, FSAR Chapter 6, will be revised to add new Subsection 6.2.4.5.1, with a LMA of LNP DEP 6.2-1, to read:

6.2.4.5.1 Preoperational Inspection and Testing

Hydrogen Ignition Subsystem

Revise the second paragraph of DCD Subsection 6.2.4.5.1, Hydrogen Ignition Subsystem, to read as follows:

Pre-operational inspection is performed to verify the location of openings through the ceilings of the passive core cooling system valve/accumulator rooms with respect to the containment pressure boundary. An analysis will be used to demonstrate that postulated hydrogen releases through these openings do not result in a failure of the containment shell.

COLA Part 7

COLA Part 7, Departures and Exemption Requests, will be revised to add the following exemption and departure:

A. STD and LNP Departures

This Departure Report includes deviations in the Levy Nuclear Plant, Units 1 and 2 COLA FSAR from the Tier 2 information in the applicable Design Control Document (DCD), pursuant to 10 CFR Part 52, Appendix D, Section VIII and Section X.B.1.

The following Departures are described and evaluated in detail in this report.

<u>Departure Number</u>	<u>Description</u>
STD DEP 1.1-1	Administrative departure for organization and numbering for the FSAR sections
LNP DEP 1.8-1	Correction of an inconsistency in regulatory citation in an interface description
LNP DEP 3.2-1	Addition of downspouts to the condensate return portion of the Passive Core Cooling System
LNP DEP 3.7-1	Use of site-specific horizontal seismic response spectra for the design of drilled shafts that support the seismic Category II portions of the Annex and Turbine Buildings.
LNP DEP 3.11-1	Revision of "Envir. Zone" numbers for Spent Fuel Pool Level instruments
LNP DEP 6.2-1	The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration.
LNP DEP 6.3-1	Quantification of the term "indefinitely" as used in the DCD for maintenance of safe shutdown conditions using the PRHR HX during non-LOCA accidents.
LNP DEP 6.4-1	Main Control Room Operator Dose
LNP DEP 6.4-2	Main Control Room Heatup
STD DEP 8.3-1	Class 1E voltage regulating transformer current limiting features

Departure LNP DEP 6.2-1 is a departure from **AP1000** Tier 1 information, in addition to Tier 2 information in the DCD; an exemption request and NRC approval is required prior to implementation.

Departure Number LNP DEP 6.2-1:

Affected DCD/FSAR Sections: Tier 1 Table 2.3.9-3, Tier 2 Subsection 6.2.4.5.1.

Summary of Departure:

The Containment Hydrogen Control System (VLS) has a function to limit the hydrogen concentration in containment following a severe accident so that it does not result in a failure of the containment shell (DCD Subsection 6.2.4). A severe accident (considered to be a beyond design basis event) involves a major core degradation or core melt that results in hydrogen production among other effects. A severe accident involving major core degradation/core melt is not a design basis accident; however, the VLS contains design features to address this scenario. The VLS promotes hydrogen burning soon after reaching the lower flammability limit. Burning off hydrogen at lower flammability limits is intended to prevent the hydrogen from reaching high concentration levels and potential adverse effects on containment integrity upon ignition. There are hydrogen igniters positioned around various areas of containment to be able to burn off hydrogen in a controlled manner to help preserve containment integrity.

There are openings in the ceilings of the Passive Core Cooling System (PXS) valve/accumulator rooms A and B (identified as Rooms 11206 and 11207 respectively) that communicate with the room above where the CMTs are located (Room 11300) that will allow access for hydrogen to vent. Igniters are placed in these areas to allow the hydrogen to ignite and burn. These openings were evaluated during the **AP600** design process in 1996 to ensure the burning hydrogen plumes would not result in a failure of the containment shell. This information was used in the **AP600** DCD (the ITAAC section and the VLS section).

The design process of the **AP1000** plant used information from the AP600 and similarly, the AP600 DCD content was used in the **AP1000** DCD as a starting point. The **AP1000** DCD contains VLS information that originated from the **AP600** including an ITAAC that specified the distance from the "primary openings" in Rooms 11206 and 11207 to the containment shell to be at least 19 feet; primary openings were stated as those that constitute 98% of the opening area (DCD Tier 1 ITAAC, Table 2.3.9-3). Similar text was placed in the VLS description (DCD Tier 2 Subsection 6.2.4.5.1).

However the design process of the **AP1000** plant moved some equipment and room layouts including some that impacted the VLS. The design of the openings was changed during the design evolution from the **AP600** to the **AP1000** such that the existing VLS ITAAC and Subsection 6.2.4.5.1 wording discussed above is no longer consistent with the revised plant design. The CMT-A opening in Room 11206 was moved closer to the containment shell while the equipment hatch opening in the same room was moved a little farther away from the shell. The CMT-B opening in Room 11207 is located farther away from the containment shell. The containment floor layout configuration reflects this design of the room vent openings in Figure 1.2-7 of the approved DCD Rev. 19.

A subsequent design change put a hatch over the Room 11206 equipment access opening, thus removing a hydrogen vent area. In 2013, it was realized the hydrogen vent effects for these design changes had not been evaluated since the **AP600** calculation. The Hydrogen Flame Zone of Influence evaluation identified the hatch over the equipment access opening needed to be removed to allow for proper hydrogen venting. A design change was proposed to remove the hatch to provide an adequate vent space and provide a weir for flood protection (not related to hydrogen venting issue).

The changes to the DCD reflect the vent path configuration in Rooms 11206 and 11207 that is consistent with the current design and to also provide clarification of "primary openings" in Rooms 11206 and 11207.

Scope/Extent of Departure:

The changes to the DCD addressed by Departure 6.2-1 revise Tier 1 ITAAC Table 2.3.9-3, Item 3, Acceptance Criteria iii and Tier 2 Subsection 6.2.4.5.1 in order to correctly identify the vent path configuration, clarify the meaning of primary openings for Rooms 11206 and 11207 to be consistent with the current design, and identify that the vent paths will be verified by pre-operational inspection.

Departure Justification:

The proposed changes correct information in the DCD regarding the plant layout of the primary openings in Containment Rooms 11206 and 11207 that will be used to vent hydrogen; specifically, changes involve the distance between the openings and the containment shell and clarifies what is designated as a primary opening for these rooms. An analysis will be performed to support the existing **AP1000** design layout configuration and demonstrate that the opening locations vent hydrogen burn plume during a severe accident such that the flame through these openings will not result in a failure of the containment shell.

The proposed changes will not increase the frequency of occurrence of an accident, nor result in a malfunction of a structure, system or component (SSC). The proposed changes regarding the primary openings layout information to be applied to pre-operational measurements and clarification of the primary openings will not result in an accident or malfunction of an SSC. The revised hydrogen vent primary openings plume will allow the containment shell to maintain integrity and as such, will not impact a design basis limit for a fission product barrier. The method to evaluate hydrogen venting during a severe accident is not a different method from that used in the DCD. The updating of the DCD language for primary openings used for venting hydrogen which will be supported by analysis does not affect resolution of an ex-vessel severe accident design feature.

Departure Evaluation:

The proposed changes correct information in the DCD regarding the plant layout of the primary openings in Containment Rooms 11206 and 11207 that will be used to vent hydrogen during a beyond design basis event (severe accident); specifically, changes involve pre-operational measurements of the openings and an analysis that demonstrates that postulated hydrogen releases through these openings do not result in a failure of the containment shell.

Therefore, this departure does not:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD.
2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD.
3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD.
4. Result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD.
5. Create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD.
6. Create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD.
7. Result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered.

8. Result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses.

This departure does not affect resolution of a severe accident issue identified in the plant-specific DCD. Therefore, this departure has no safety significance.

NRC Approval Requirement:

This departure requires an exemption from the requirements of 10 CFR Part 52, Appendix D, Section III.B, which requires compliance with Tier 1 requirements of the **AP1000** DCD. Therefore, an exemption is requested in Part B of this COL Application Part.

B. Levy Nuclear Plant, Units 1 and 2 Exemption Requests

Duke Energy Florida, Inc. (DEF) requests the following exemptions related to:

1. Not used, and
2. Combined License (COL) Application Organization and Numbering
3. Special Nuclear Material (SNM) Material Control and Accounting Program Description
4. Containment Cooling Changes in regard to Passive Core Cooling System Condensate Return
5. Main Control Room Dose
6. Main Control Room Heatup
7. Combustible Gas Control in Containment

Discussion and justification for each of these requests is provided in the following pages.

7) Combustible Gas Control in Containment

Applicable Regulation(s): 10 CFR Part 52, Appendix D, Section III.B

Specific wording from which exemption is requested:

"III. Scope and Contents

- B. An applicant or licensee referencing this appendix, in accordance with Section IV of this appendix, shall incorporate by reference and comply with the requirements of this appendix, including Tier 1, Tier 2 (including the investment protection short-term availability controls in Section 16.3 of the DCD), and the generic TS except as otherwise provided in this appendix. Conceptual design information in the generic DCD and the evaluation of severe accident mitigation design alternatives in appendix 1B of the generic DCD are not part of this appendix."

Pursuant to 10 CFR §52.63(b)(1), an exemption from elements of the design as certified in the 10 CFR Part 52, Appendix D, design certification rule is requested for a plant-specific Tier 1 non-material departure from the **AP1000** DCD for Tier 1 information. This exemption request is in accordance with the provisions of 10 CFR §50.12, 10 CFR §52.7, and 10 CFR Part 52, Appendix D.

Discussion:

The changes requested to Tier 1 Table 2.3.9-3 and associated Tier 2 change to Subsection 6.2.4.5.1 provide a revised acceptance criteria for hydrogen venting inside containment, provide reasonable assurance that the facility has been constructed and will be operated in conformity with the applicable design criteria, codes and standards, and demonstrate acceptable Containment Hydrogen Control System performance during design basis scenarios.

Conclusion:

DEF evaluated this exemption request in accordance with 10 CFR Part 52, Appendix D, Section VIII.A.4, 10 CFR §50.12, 10 CFR §52.7 and 10 CFR §52.63, which state that the NRC may grant exemptions from the requirements of the regulations provided the following six conditions are met: 1) the exemption is authorized by law [§50.12(a)(1)]; 2) the exemption will not present an undue risk to the health and safety of the public [§50.12(a)(1)]; 3) the exemption is consistent with the common defense and security [§50.12(a)(1)]; 4) special circumstances are present [§50.12(a)(2)]; 5) the special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption [§52.63(b)(1)]; and 6) the design change will not result in a significant decrease in the level of safety [Part 52, Appendix D, VIII.A.4]. The requested exemption satisfies the criteria for granting specific exemptions, as described below.

1. This exemption is authorized by law

The NRC has authority under 10 CFR §§ 50.12, 52.7, and 52.63 to grant exemptions from the requirements of NRC regulations. Specifically, 10 CFR §§50.12 and 52.7 state that the NRC may grant exemptions from the requirements of 10 CFR Part 52 upon a proper showing. No law exists that would preclude the changes covered by this exemption request. Additionally, granting of the proposed exemption does not result in a violation of the Atomic Energy Act of 1954, as amended, or the Commission's regulations.

Accordingly, this requested exemption is "authorized by law," as required by 10 CFR §50.12(a)(1).

2. This exemption will not present an undue risk to the health and safety of the public

The proposed exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would allow changes to elements of the plant-specific Tier 1 DCD to depart from the **AP1000** certified (Tier 1) design information. The plant-specific Tier 1 DCD will continue to reflect the approved licensing basis for the applicant, and will maintain a consistent level of detail with that which is currently provided elsewhere in Tier 1 of the plant-specific DCD. Because the change to the ITAAC acceptance criteria in Tier 1 Table 2.3.9-3 maintains the design margins of the Containment Hydrogen Control System, the changed acceptance criteria will ensure the protection of the health and safety of the public. Therefore, no adverse safety impact which would present any additional risk to the health and safety of the public is present. The affected Design Description in the plant-specific Tier 1 DCD will continue to provide the detail necessary to support the performance of the associated ITAAC.

Therefore, the requested exemption from 10 CFR 52, Appendix D, Section III.B would not present an undue risk to the health and safety of the public.

3. The exemption is consistent with the common defense and security

The exemption from the requirements of 10 CFR 52, Appendix D, Section III.B would change elements of the plant-specific Tier 1 DCD by departing from the **AP1000** certified (Tier 1) design information relating to the control of combustible gas inside containment. The exemption does not alter the design, function, or operation of any structures or plant equipment that are necessary to maintain a secure status of the plant. The proposed exemption has no impact on plant security or safeguards procedures.

Therefore, the requested exemption is consistent with the common defense and security.

4. Special circumstances are present

10 CFR §50.12(a)(2) lists six "special circumstances" for which an exemption may be granted. Pursuant to the regulation, one of these special circumstances must be present in order for the NRC to consider granting an exemption request. The requested exemption meets the special circumstances of 10 CFR §50.12(a)(2)(ii). That subsection defines special circumstances as when "Application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule."

The rule under consideration in this request for exemption from Tier 1 Table 2.3.9-3 is 10 CFR 52, Appendix D, Section III.B, which requires that an applicant referencing the **AP1000** Design Certification Rule (10 CFR Part 52, Appendix D) shall incorporate by reference and comply with the requirements of Appendix D, including Tier 1 information. The Levy Units 1 and 2 COLA references the **AP1000** Design Certification Rule and incorporates by reference the requirements of 10 CFR Part 52, Appendix D, including Tier 1 information. The underlying purpose of Appendix D, Section III.B is to describe and define the scope and contents of the **AP1000** design certification, and to require compliance with the design certification information in Appendix D to maintain the level of safety in the design.

The proposed change to the ITAAC acceptance criteria for combustible gas control maintains the design margins of the Containment Hydrogen Control System. This change does not impact the ability of any structures, systems, or components to perform their functions or negatively impact safety. Accordingly, this exemption from the certification information in Tier 1 Subsection Table 2.3.9-3 will enable the applicant to safely construct and operate the **AP1000** facility consistent with the design certified by the NRC in 10 CFR 52, Appendix D.

Therefore, special circumstances are present, because application of the current generic certified design information in Tier 1 as required by 10 CFR Part 52, Appendix D, Section III.B, in the particular circumstances discussed in this request is not necessary to achieve the underlying purpose of the rule.

5. The special circumstances outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption

Based on the nature of the changes to the plant-specific Tier 1 information and the understanding that these changes support the design function of the Containment Hydrogen

Control System, other **AP1000** applicants and licensees will likely request this exemption. However, if this is not the case, the special circumstances continue to outweigh any decrease in safety from the reduction in standardization because the key design functions of the Containment Hydrogen Control System associated with this request will continue to be maintained. This exemption request and the associated marked-up Tier 1 Table 2.3.9-3 demonstrates that the Containment Hydrogen Control System function continues to be maintained following implementation of the change from the generic **AP1000** DCD, thereby minimizing the safety impact resulting from any reduction in standardization.

Therefore, the special circumstances associated with the requested exemption outweigh any decrease in safety that may result from the reduction in standardization caused by the exemption. In fact, as described in Condition 6 below, the exemption will result in no reduction in the level of safety.

6. The design change will not result in a significant decrease in the level of safety.

The exemption revises the plant-specific DCD Tier 1 information by revising the acceptance criteria for an ITAAC in Table 2.3.9-3. There is no physical change to the plant associated with the change to the ITAAC acceptance criteria. Because the Containment Hydrogen Control System function is met, there is no reduction in the level of safety. Therefore, the change will not result in a significant decrease in the level of safety.

As demonstrated above, this exemption request satisfies NRC requirements for an exemption to the design certification rule for the **AP1000** plant.

COLA Part 10

COLA Part 10, Appendix B. Inspections, Tests, Analyses and Acceptance Criteria, **AP1000** DCD Tier 1 ITAAC, will be revised to add the following departure.

Containment Hydrogen Control System ITAAC

The ITAAC Acceptance Criteria for the in-containment PXS compartment vents are revised to reflect the current plant configuration. The ITAAC acceptance criteria for Table 2.3.9-3, Item 3, are clarified to read as shown in the attached Table 2.3.9-3, with a LMA of LNP DEP 6.2-1.

Attachment:

Revised Table 2.3.9-3

Table 2.3.9-3
Inspections, Tests, Analyses, and Acceptance Criteria

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement of the VLS is as described in the Design Description of this Section 2.3.9.	Inspection of the as-built system will be performed.	The as-built VLS conforms with the functional arrangement as described in the Design Description of this Section 2.3.9.
2.a) The hydrogen monitors identified in Table 2.3.9-1 are powered by the non-Class 1E dc and UPS system.	Testing will be performed by providing a simulated test signal in each power group of the non-Class 1E dc and UPS system.	A simulated test signal exists at the hydrogen monitors identified in Table 2.3.9-1 when the non-Class 1E dc and UPS system is provided the test signal.
2.b) The components identified in Table 2.3.9-2 are powered from their respective non-Class 1E power group.	Testing will be performed by providing a simulated test signal in each non-Class 1E power group.	A simulated test signal exists at the equipment identified in Table 2.3.9-2 when the assigned non-Class 1E power group is provided the test signal.
3. The VLS provides the nonsafety-related function to control the containment hydrogen concentration for beyond design basis accidents.	i) Inspection for the number of igniters will be performed. ii) Operability testing will be performed on the igniters. iii) An inspection of the as-built containment internal structures will be performed.	i) At least 64 hydrogen igniters are provided inside containment at the locations specified in Table 2.3.9-2. ii) The surface temperature of the igniter exceeds 1700°F. iii) The equipment access opening and CMT-A opening constitute at least 98% of vent paths within Room 11206 that vent to Room 11300. The minimum distance between the equipment access opening and containment shell is at least 24.3 feet. The minimum distance between the CMT-A opening and the containment shell is at least 9.4 feet. The CMT-B opening constitutes at least 98% of vent paths within Room 11207 that vent to Room 11300 and is a minimum distance of 24.6 feet away from the containment shell. Other openings through the ceilings of these rooms must be at least 3 feet from the containment shell. An analysis exists and concludes that ignition of postulated hydrogen releases through these openings will not result in a failure of the containment shell.

	<p>iv) An inspection will be performed of the as-built IRWST vents that are located in the roof of the IRWST along the side of the IRWST next to the containment shell.</p>	<p>iv) The discharge from each of these IRWST vents is oriented generally away from the containment shell.</p>
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